CHILLED WATER COOLING COIL SCHEDULE (OPT#5 AND OPT#8)

COIL NO.	SYSTEM	CFM	MAX FACE VEL. FPM	MAX S.P. LOSS IN	ENT. AIR °F		LVG. AIR °F		CIRCULATING FLUID					MIN MBH	REMARKS
					Db	Wb	Db	Wb	GPM	TEMP IN °F	TEMP OUT °F	MAX LOSS FT. FLUID	ROWS/ FPI		
(E)CC-19	AH-19	13400	450		95	76	53.0	52.9	100	44	–	19.2	8/–	––	DEMOLISHED.
NEW CC-19	AH-19	13400	450	0.4	95	76	53.0	52.9	100	44	63.4	5.12	8/12	966	DESIGN OPT#8. NOTE 1. COIL DIMENSIONS: 51" HEIGHT, 84" LENGTH. SELECTED AT ASHRAE 0.4% ENTHALPY CONDITION
(E)CC-44	AH-44	14620	475	0.82	87	68	53	–	130.9	44	54	7.11	6/9	668	DEMOLISH FROM EXISTING ENERGY LABS UNIT AND PREPARE FOR NEW COIL.
NEW CC-44	AH-44	14620	475	0.82	87	68	53	–	66	44	64	10	NOTE 2	668	DESIGN OPT#5.
(E)CC-45	AH-45	18450	485	0.92	84	67	53	–	156	44	54	4.1	6/10	796	DEMOLISH FROM EXISTING ENERGY LABS UNIT AND PREPARE FOR NEW COIL.
NEW CC-45	AH-45	18450	485	1.00	84	67	53	–	78	44	64	10	NOTE 2	796	DESIGN OPT#5.
(E)CC-46	AH-46	46220	499	1.1	84	67	53	–	392	44	54	9.78	6/ 12	1994	DEMOLISH FROM EXISTING ENERGY LABS UNIT AND PREPARE FOR NEW COIL.
NEW CC-46	AH-46	46220	499	1.13	84	67	53	–	196	44	64	10	NOTE 2	1994	DESIGN OPT#5. COILS ARE STAGGERED. NEW 8 ROW COIL WILL REQUIRE REPLACEMENT OF DIVIDER.
(E)CC-47	AH-47	18810	494	0.95	84	67	53	–	160	44	54	4.25	6/ 10	808	DEMOLISH FROM EXISTING ENERGY LABS UNIT AND PREPARE FOR NEW COIL.
NEW CC-47	AH-47	18810	494	1.13	84	67	53	–	80	44	64	10	NOTE 2	808	DESIGN OPT#5.
(E)CC-48	AH-48	16240	488	0.93	84	67	53	–	138	44	54	10	6/ 10	701	DEMOLISH FROM EXISTING ENERGY LABS UNIT AND PREPARE FOR NEW COIL.
NEW CC-48	AH-48	16240	488	1.01	84	67	53	–	69	44	64	10	NOTE 2	701	DESIGN OPT#5.
(E)CC-49	AH-49	32190	490	0.94	84	67	53	–	273	44	54	5.6	5/ 13	1363	DEMOLISH FROM EXISTING ENERGY LABS UNIT AND PREPARE FOR NEW COIL.
NEW CC-49	AH-49	32190	490	1.18	84	67	53	–	137	44	64	10	NOTE 2	1363	DESIGN OPT#5. COILS ARE STAGGERED. NEW 8 ROW COIL WILL REQUIRE REPLACEMENT OF DIVIDER.
(E)CC-50	AH-50	19150	503	0.97	84	67	53	–	162	44	54	4.39	6/ 10	820	DEMOLISH FROM EXISTING ENERGY LABS UNIT AND PREPARE FOR NEW COIL.
NEW CC-50	AH-50	19150	503	1.08	84	67	53	–	81	44	64	10	NOTE 2	820	DESIGN OPT#5.

NOTES:
1. ENTIRE COIL SHALL BE COPPER MATERIAL. MOUNTING HARDWARE SHALL BE STAINLESS STEEL. ADDITIONAL COIL SELECTION ASSUMPTIONS: 0.5" TUBE DIAMETER, 272 TUBES, 4 TPC, SMOOTH RIFLE, 0.008" FIN THICKNESS, V-WAFFLE FINS.
2. ADDITIONAL COIL ROWS ARE REQUIRED TO MEET NEW LEAVING WATER TEMPERATURE (8 ROWS). CONTRACTOR SHALL MODIFY EXISTING COIL MOUNTING HARDWARE AND DRAIN PAN TO ACCOMMODATE NEW COIL SIZE. CONSULT ORIGINAL EQUIPMENT MANUFACTURER FOR PRICING INFORMATION (ENERGYLABS).

PUMP SCHEDULE (OPT#6)

MARK	SYSTEM	CIRCULATING FLUID				% EFF.	TYPE	MOTOR				MANUFAC-TURER	MODEL	REMARKS
		FLUID	GPM	TDH (FT)	SP. GR.			PHASE/VOLT	NOM. HP	RPM	CONTROL			
(E)P-221, (E)P-222	CHW	H2O	1175	50	1.0	––	FRAME MOUNTED, END SUCTION	3/460	20	1765	(E)VFD-P221, (E)VFD-P222	PACO	FE-5011	DEMOLISHED.
P-221, P-222	CHW	H2O	1256	78.3	1.0	83	FRAME MOUNTED, END SUCTION	3/460	30	1760	VFD-P221, VFD-P222	TACO	FI-6013	NOTE 1.

NOTES:
1. FACTORY FURNISHED OPTIONS: SUCTION GUIDE, PREMIUM EFFICIENCY MOTOR (VFD-RATED), REFER TO SPECIFICATIONS.

VARIABLE FREQUENCY DRIVE SCHEDULE (OPT#6)

UNIT NO.	SERVICE	TYPE	ELECTRICAL		BYPASS	INPUT DIS-CONECT	EMCS SERIAL COMM	MANUFACTURER	REMARKS
			PHASE/ VOLT	MOTOR HP					
(E)VFD-P221, (E)VFD-P222	(E)P-221, (E)P-222	NEMA 1	3/460	20	–	–	–	–	
VFD-P221, VFD-P222	P-221, P-222	NEMA 1	3/460	30	YES	YES, NOTE 1	YES	ABB ACH-550	

NOTES:
1. FURNISHED WITH CIRCUIT BREAKER DISCONNECT. MINIMUM SHORT CIRCUIT WITHSTAND RATING OF ASSEMBLY SHALL BE 30 KAIC.

PIPING TYPE, MATERIAL, AND INSULATION SCHEDULE (BASE BID)

SERVICE	ABBREVIATION	MATERIAL (NOTE 1,2)	TYPE (NOTE 1)	INSULATION TYPE	REMARKS
(ABOVE GROUND) CHILLED WATER PIPING	CHWS/R	STEEL	ASTM A53 GRADE B ERW, SCHEDULE 40, GROOVED OR THREADED.	REFER TO SPECIFICATIONS	NOTES 1,2.

NOTES:
1. REFER TO SPECIFICATIONS FOR MORE INFORMATION AND MORE MATERIAL OPTIONS.
2. PROVIDE DIELECTRIC FITTINGS WHERE COPPER TUBING AND FERROUS METAL PIPE ARE JOINED.

ABBREVIATIONS

SYMBOL	DESCRIPTION
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
BOP	BOTTOM OF PIPE
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CO	CLEAN OUT
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
D	DRAIN (CONDENSATE)
Db	DRY BULB TEMPERATURE
Dp	DEWPOINT TEMPERATURE
E/A	EXHAUST AIR
EC	ELECTRIC CONTRACTOR
EX. or (E)	EXISTING
FC	FLEXIBLE CONNECTION
FL	FLOOR
FP	FIRE PROTECTION
GC	GENERAL CONTRACTOR
HB	HOSE BIBB
HP	HORSEPOWER
HWS	HEATING HOT WATER SOURCE
HWR	HEATING HOT WATER RETURN
INV	INVERT
MAX	MAXIMUM
MC	MECHANICAL CONTRACTOR
MIN	MINIMUM
NOM	NOMINAL
O/A	OUTDOOR AIR
P	PUMP
PD	PRESSURE DROP
PICV	PRESSURE INDEPENDENT CONTROL VALVE
R/A	RETURN AIR
Rh	RELATIVE HUMIDITY
S/A	SUPPLY AIR
Sp. Gr.	SPECIFIC GRAVITY
SP	STATIC PRESSURE
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
V	VENT PIPING
Wb	WET BULB TEMPERATURE

LEGEND

SYMBOL	DESCRIPTION
2 / H4	DETAIL NUMBER / DRAWING NUMBER WHERE DRAWN
A / H7	SECTION LETTER / DRAWING NUMBER WHERE SHOWN
	POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK
	LIMIT OF DEMOLITION
	DIRECTION OF FLOW
	REDUCER OR INCREASER
	ECCENTRIC REDUCER
	TOP CONNECTION, 45° OR 90°
	BOTTOM CONNECTION, 45° OR 90°
	SIDE CONNECTION
	CAPPED OUTLET
	RISE OR DROP IN PIPE
	UNION
	STRAINER
	THERMOMETER
	PRESSURE GAGE
	WATER FLOW MEASURING DEVICE
	GATE VALVE
	GLOBE VALVE
	GATE VALVE WITH 3/4 " HOSE ADAPTER
	CHECK VALVE
	ANGLE GLOBE VALVE
	BUTTERFLY VALVE
	BALL VALVE
	MANUAL AIR VENT
	TEST PLUG (PRESSURE/TEMPERATURE)

Phasing:

WORK HOURS FOR THE WORK, AND FOR AREAS WHICH IMPACT BUILDING ENTRANCES AND FACILITY FUNCTIONS SHALL BE AS REQUIRED. NORMAL HOURS ARE ANTICIPATED HOWEVER MULTIPLE PORTIONS OF THE WORK SHALL BE REQUIRED TO OCCUR NIGHTS, WEEKENDS AND OTHERWISE AS REQUIRED. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO ALL CRANE LIFTS AND ALL OUTAGES. TRAFFIC CONTROL SHALL BE THE CONTRACTOR'S RESPONSIBILITY, INCLUDING AHAs, TRAFFIC CONTROL PLANS, FLAGGERS, SIGNAGE, BARRICADES, LIGHTING, PLATING, AND ANY ADDITIONAL RESOURCES AS REQUIRED ENSURING FACILITY ACCESS AND FACILITY FUNCTION IS NOT DISRUPTED. A5#01

IN ADDITION TO SPECIFICATION REQUIREMENTS NOISE CONTROL PLANS SHALL BE REQUIRED TO ADDRESS SOURCE CONTROL AND PATH CONTROL TO ENSURE PATIENTS, EMPLOYEES AND FACILITY FUNCTIONS ARE NOT DISTURBED.

EXACT METHODS AND PROCEDURES FOR UTILITY OUTAGES WILL REQUIRE ADVANCE COORDINATION AND PLANNING TO INCLUDE A MINIMUM APPROVAL REQUIREMENT OF 1 MONTHS PRIOR. SCHEDULE APPROVAL AND 100% OF SUBMITTAL APPROVALS SHALL BE REQUIRED PRIOR TO CONSTRUCTION START. SUBMITTAL EXCHANGE OR APPROVED EQUAL PER THE M&O STANARDS SHALL BE UTILIZED FOR SUBMITTAL TRANSMISSIONs. ALL OUTAGES SHALL BE COMPLETED IN A MANNER THAT ELIMINATES, OR LIMITS, DISTURBANCE TO THE FACILITY TO INCLUDE TEMPORARY SYSTEMS, PIPING, CAPS, ETC. AS REQUIRED.

CHILLED WATER SHUTDOWNS SHALL OCCUR IN A MANNER THAT LIMITS DISRUPTION TO THE FACILITY. THE CONTRACTOR SHALL BE REQUIRED TO REPLACE CHEMICALS REMOVED FROM THE SYSTEM DURING ANY SHUTDOWNS. SCHEDULE APPROVAL AND 100% OF SUBMITTAL APPROVALS SHALL BE REQUIRED PRIOR TO CONSTRUCTION START.

General Notes:

1. COORDINATE WITH OWNER THE DISCONNECTION OF ANY SERVICES PRIOR TO COMMENCING WORK.
2. PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
3. ALL WORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN DUCTWORK OR PIPING AROUND OBSTRUCTIONS SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
4. CONTRACTOR SHALL VISIT SITE AND BECOME FAMILIAR WITH THE EXISTING CONDITIONS PRIOR TO COMMENCING WORK. REPORT ANY DISCREPANCIES TO ENGINEER.
5. LOCATE ALL MECHANICAL EQUIPMENT FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS AND VALVING.
6. INSTALL PIPING SO THAT ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES, AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.
7. UNIONS AND/OR FLANGES SHALL BE INSTALLED AT EACH PIECE OF EQUIPMENT, IN BYPASSES, AND IN LONG PIPING RUNS (100 FEET OR MORE) TO PERMIT DISASSEMBLY FOR ALTERATION AND REPAIRS.
8. REFER TO SHEET GI-001 FOR DESCRIPTION OF BASE BID AND OPTIONS.
9. CONTRACTOR SHALL REFERENCE SITE UTILITY PLANS FROM "OTHER" PROJECTS. PLANS SHALL BE SUPPLIED BY VA COTR AND ARE INTENDED TO ASSIST THE CONTRACTOR IN HIS WORK. HOWEVER, CONTRACTOR IS RESPONSIBLE TO CONFIRM ALL SITE UTILITIES PRIOR TO COMMENCING WORK.
10. CONTRACTORS SHALL SURVEY ALL EXISTING CONDITIONS. CONTRACTOR SURVEY SHALL BE DETAILED ENOUGH TO DETERMINE LOCATION AND CONDITION OF ALL EXISTING RACKS, UTILITIES, EQUIPMENT, ETC. IN AREAS IN WHICH WORK IS BEING PERFORMED. ROOFS SHALL REQUIRE A ROOFING CONTRACTOR SURVEY TO IDENTIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK.
11. PIPE ROUTING INDICATED IS PROPOSED AND SUBJECT TO EXISTING CONDITIONS. CONTRACTOR SHALL ROUTE ALL PIPE AROUND OBSTACLES ENCOUNTERED. PROVIDE COORDINATION DRAWINGS AS REQUIRED. WHERE NECESSARY ADDITIONAL PIPING AND PIPE RACKS SHALL BE REQUIRED TO COMPLETE THE ROUTE. OWNER PROVIDED SITE UTILITIES PLANS ARE FOR REFERENCE ONLY AND ARE NOT TO BE SCALED OR CONSIDERED ALL-INCLUSIVE.
12. STORAGE ON SITE IS EXTREMELY LIMITED. ALL MATERIAL IS EXPECTED TO BE BROUGHT ON SITE AS REQUIRED. PERMANENT ON SITE STORAGE WILL BE PROVIDED IF AND AS AVAILABLE.
13. AS A PART OF THIS CONTRACT, THE CONTRACTOR SHALL BE REQUIRED TO REPLACE ALL CHEMICALS REMOVED FROM THE SYSTEM DUE DRAINAGE REQUIREMENTS. HOT TAPS SHALL NOT BE CONSIDERED OPTIONAL. SEE M&O STANDARDS FOR SPECIFIC REQUIREMENTS REGARDING CHEMICAL TREATMENT.
14. PROVIDE PHOENIX VALVE SRV-200-XXX MICROSERVER, AND CSA 100-MCT MIRCROSERVER COMMISSIONING TOOL. PROVIDE 16 HOURS TRAINING AND SERVICE SUPPORT FROM AUTHORIZED PHOENIX VALVE TRAINING AND SERVICE SUPPORT PROVIDER. TRAINING SHALL BE ONSITE FOR UP TO 10 VA EMPLOYEES.
15. ALL CONTRACT EMPLOYEES SHALL BE REQUIRED TO ATTEND A FACILITY SAFETY MEETING. THIS MEETING IS HELD EVERY OTHER MONDAY AT 0830 FOR UP TO 1 HOUR.
16. PROVIDE 1 OFFICIAL PDF COPY OF ALL REFERENCES REQUIRED WITHIN THE SPECIFICATIONS FOR VA USE.
17. COORDINATION WITH OTHER CONTRACTORS SHALL BE A REQUIREMENT IN ORDER TO ENSURE ROUTING AND SHUTDOWNS DO NOT INTERFERE WITH CONTRACT WORK OR FACILITY FUNCTIONS. SHUTDOWNS MAY BE COMBINED IN ORDER TO LIMIT FACILITY INTERRUPTIONS. A5#01
18. CONTRACTOR SHALL PURCHASE AND PROVIDE A FULL VERSION OF PIPE-FLO PROFESSIONAL AND A TRAINING COURSE THE THE VA.

Revisions:	Date
REPACKAGE AND ADJUST SCOPE	04/07/15

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Registered Professional Engineer Certificate No. 46687 DUANE M. PALIN Date Signed 08/19/15 ARIZONA U.S.A.
EXPIRES 09/30/2016

Drawing Title: **MECHANICAL LEGENDS & ABBREVIATIONS**

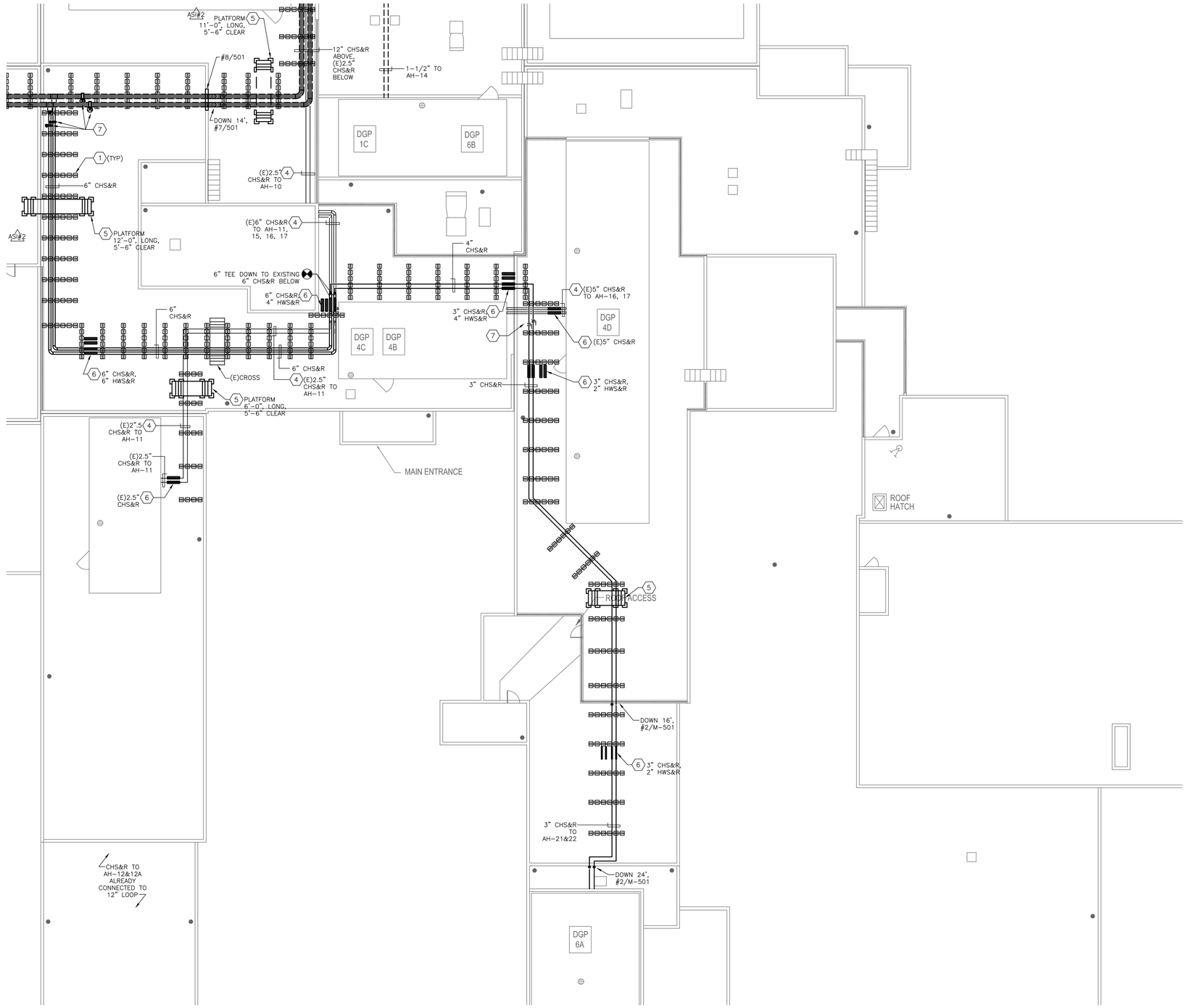
Project Title: CARL T. HAYDEN V.A.M.C. INCREASE CAMPUS ELECTRICAL – CW CAPACITY

Building Number: CAMPUS | Checked: -- | Drawn: --

PHOENIX, ARIZONA

Date: 08/19/2015
Project No.: 644-13-015
DRAWING NO.: **M-001**
Dwg. 4 of 15

Office of Facilities — Veterans Administration



1 MECHANICAL ROOF PLAN - NORTH EAST
SCALE: 3/32" = 1'-0"

General Notes:

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES.
2. LOCATIONS AND QUANTITIES OF ROOF SUPPORTS SHOWN FOR REFERENCE ONLY. PROJECT INSTALLING THE ROOF SUPPORTS IS ONGOING AT TIME OF DESIGN.
3. IF AN ALTERNATE IS DEDUCTED, PROVIDE A TEE, BFLY VALVE, AND BLIND FLANGE FOR THE FUTURE WORK.

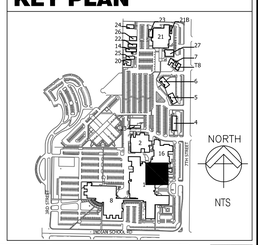
New Work Keynotes: (#)

AS#01
1. EXISTING UNISTRUT SUPPORT STRUCTURES ("PHP SYSTEMS", SHOWN SCREENED) WITH DESIGN CAPACITY FOR NEW CHILLED WATER PIPING. THE CONTRACTOR SHALL HAVE 'PHP' RECERTIFY THE EXISTING SUPPORT STRUCTURES AND IDENTIFY ANY DEFICIENCIES. EXISTING HEATING HOT WATER PIPING IS PRESENT ON THE STRUCTURE. CONTRACTOR IS RESPONSIBLE FOR MOVING THE EXISTING HEATING PIPING AND PROVIDING ADDITIONAL PIPING, FITTINGS, AND INSULATION AT THE CHILLED OR HEATING PIPING TO ACCOMMODATE THE NEW WORK. THE CONTRACTOR IS RESPONSIBLE FOR CORRECTING ALL DEFICIENCIES WITH THE SUPPORT STRUCTURE. PROVIDE NEW ROLLER SUPPORTS PER DETAIL #6/M-501.
2. EXISTING UNISTRUT SUPPORT STRUCTURES (SHOWN SCREENED) WITH SPACE FOR NEW CHILLED WATER PIPING, UNLESS NOTED OTHERWISE. PROVIDE NEW ROLLER SUPPORTS.
3. EXISTING 12" CHS&R EXTENDS TO ROOF OF CENTRAL PLANT. REFER TO SHEET M-403 FOR CONTINUATION.
4. REMOVE EXISTING INSULATION FROM EXISTING CHILLED WATER PIPING ON ROOF (DAMAGED). INSTALL NEW INSULATION.
5. PROVIDE CROSSOVER STAIR EQUAL TO 'PHP CROSSOVER'. LISTED HEIGHT AND WIDTH IS FOR REFERENCE ONLY. VERIFY REQUIRED HEIGHT AND WIDTH WITH PIPE LAYOUT.
6. PROTECT PIPING PER DETAIL #4/M-501.
7. PROVIDE FULL-SIZE BUTTERY-FLY ISOLATION VALVES. PROVIDE 3/4" DRAINS WITH SHUTOFF BALL VALVES BELOW.

Piping Legend

DOUBLE-LINE	SINGLE-LINE	OPTION	SYSTEM
▬▬▬▬	- - - -	BASE BID	MAIN LOOP
▭▭▭▭	————	OPT#3	EAST BRANCH

KEY PLAN



Revisions:	Date
AS#01 BID OPTION SCOPE MODIFICATION	03/05/14
AS#02 BID OPTION SCOPE MODIFICATION REPACKAGE AND ADJUST SCOPE	10/06/14 04/07/15

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Registered Professional Engineer — Certificate No. 46687 — DUANE M. PALIN — Date Signed — ARIZONA — U.S.A.
EXPIRES 09/30/2016

Drawing Title: **MECHANICAL ROOF PLAN - NORTH EAST**

Project Title: CARL T. HAYDEN V.A.MC.
INCREASE CAMPUS ELECTRICAL – CW CAPACITY

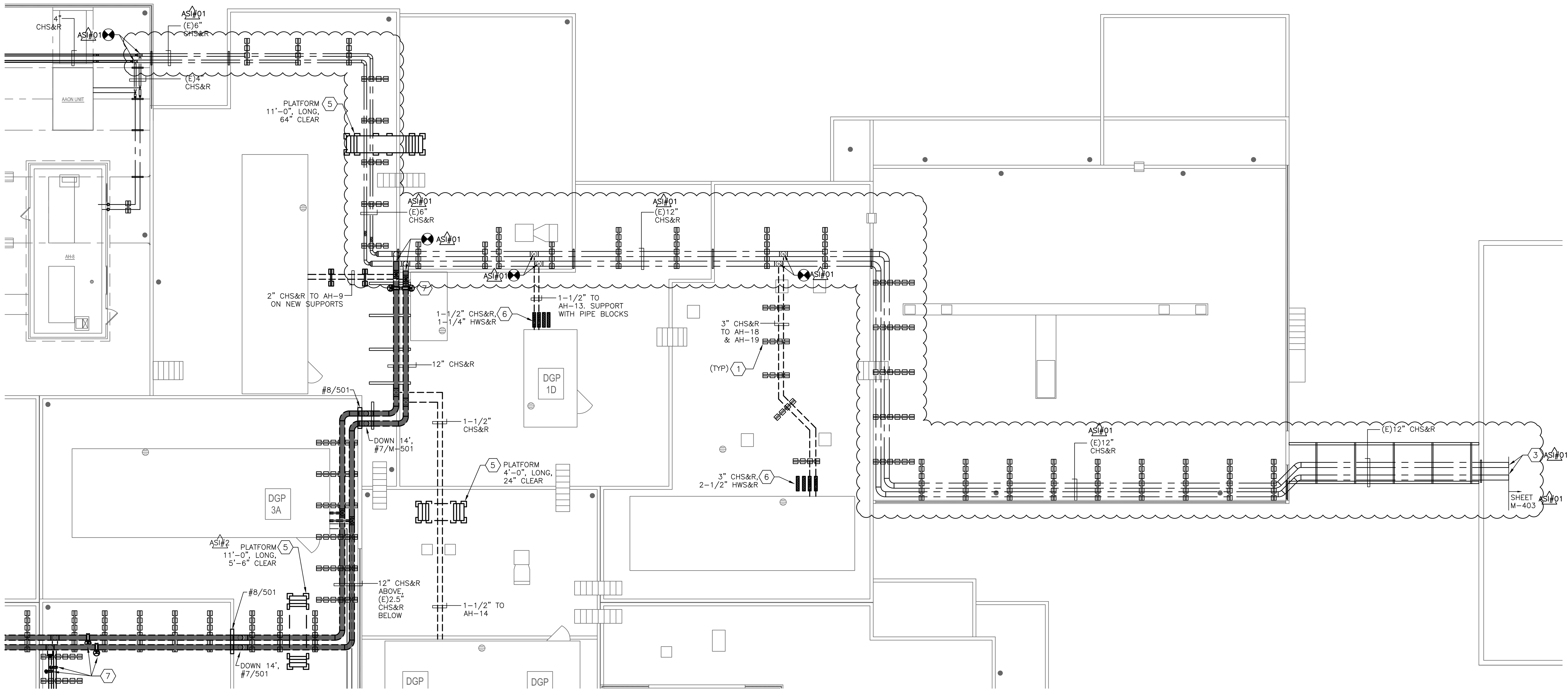
Building Number: CAMPUS | Checked: -- | Drawn: --

PHOENIX, ARIZONA

Date: 08/19/2015
Project No.: 644-13-015

DRAWING NO.: **M-101-NE**
Dwg. 6 of 15

Office of Facilities — Veterans Administration



1 MECHANICAL ROOF PLAN - NORTH WEST
SCALE: 3/32" = 1'-0"

General Notes:

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES.
2. LOCATIONS AND QUANTITIES OF ROOF SUPPORTS SHOWN FOR REFERENCE ONLY. PROJECT INSTALLING THE ROOF SUPPORTS IS ONGOING AT TIME OF DESIGN.
3. IF AN ALTERNATE IS DEDUCTED, PROVIDE A TEE, BFLY VALVE, AND BLIND FLANGE FOR THE FUTURE WORK.

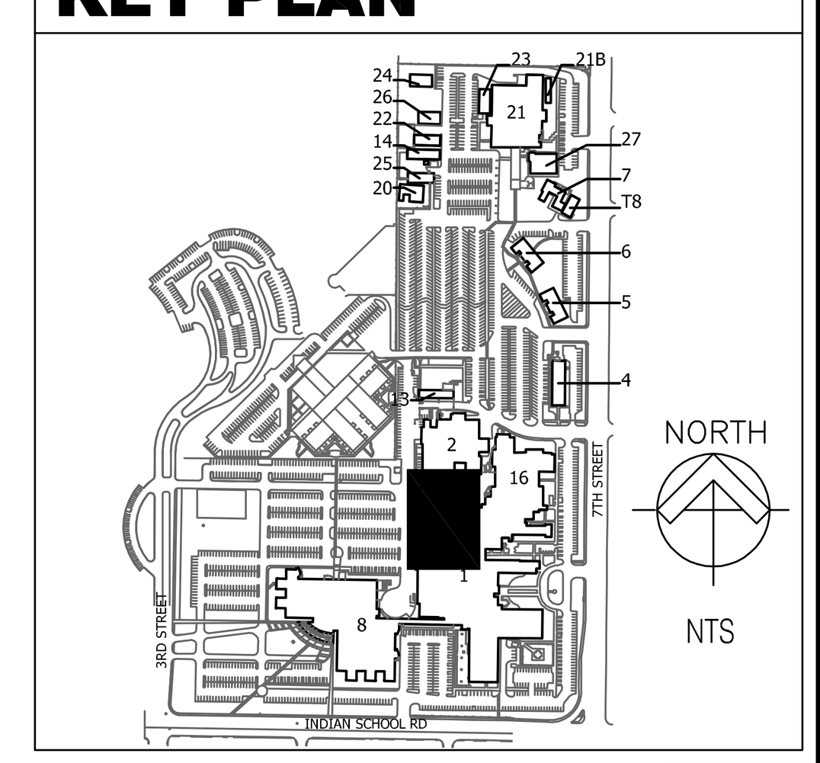
New Work Keynotes:

1. EXISTING UNISTRUT SUPPORT STRUCTURES ('PHP SYSTEMS', SHOWN SCREENED) WITH DESIGN CAPACITY FOR NEW CHILLED WATER PIPING. THE CONTRACTOR SHALL HAVE 'PHP' RECERTIFY THE EXISTING SUPPORT STRUCTURES AND IDENTIFY ANY DEFICIENCIES. EXISTING HEATING HOT WATER PIPING IS PRESENT ON THE STRUCTURE. CONTRACTOR IS RESPONSIBLE FOR MOVING THE EXISTING HEATING PIPING AND PROVIDING ADDITIONAL PIPING, FITTINGS, AND INSULATION AT THE CHILLED OR HEATING PIPING TO ACCOMMODATE THE NEW WORK. THE CONTRACTOR IS RESPONSIBLE FOR CORRECTING ALL DEFICIENCIES WITH THE SUPPORT STRUCTURE. PROVIDE NEW ROLLER SUPPORTS PER DETAIL #6/M-501.
2. EXISTING UNISTRUT SUPPORT STRUCTURES (SHOWN SCREENED) WITH SPACE FOR NEW CHILLED WATER PIPING, UNLESS NOTED OTHERWISE. PROVIDE NEW ROLLER SUPPORTS.
3. EXISTING 12" CHS&R EXTENDS TO ROOF OF CENTRAL PLANT. REFER TO SHEET M-403 FOR CONTINUATION.
4. REMOVE EXISTING INSULATION FROM EXISTING CHILLED WATER PIPING ON ROOF (DAMAGED). INSTALL NEW INSULATION.
5. PROVIDE CROSSOVER STAIR EQUAL TO 'PHP CROSSOVER'. LISTED HEIGHT AND WIDTH IS FOR REFERENCE ONLY. VERIFY REQUIRED HEIGHT AND WIDTH WITH PIPE LAYOUT.
6. PROTECT PIPING PER DETAIL #4/M-501.
7. PROVIDE FULL-SIZE BUTTERY-FLY ISOLATION VALVES. PROVIDE 3/4" DRAINS WITH SHUTOFF BALL VALVES BELOW.

Piping Legend

DOUBLE-LINE	SINGLE-LINE	OPTION	SYSTEM
(shaded double line)	------	BASE BID	MAIN LOOP
(open double line)	———	OPT#2	WEST BRANCH

KEY PLAN



Revisions:	Date
ASI#01 BID OPTION SCOPE MODIFICATION	03/05/14
ASI#02 ADDITIONAL STAIRS	10/06/14
REPACKAGE AND ADJUST SCOPE	04/07/15

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Registered Professional Engineer (Mechanical) CERTIFICATE NO. 46687 DUANE M. PALIN Date Signed 08/19/15 ARIZONA U.S.A.
EXPIRES 09/30/2016

Drawing Title: **MECHANICAL ROOF PLAN - NORTH WEST**

Project Title: CARL T. HAYDEN V.A.M.C. INCREASE CAMPUS ELECTRICAL – CW CAPACITY

Date: 08/19/2015

Project No.: 644-13-015

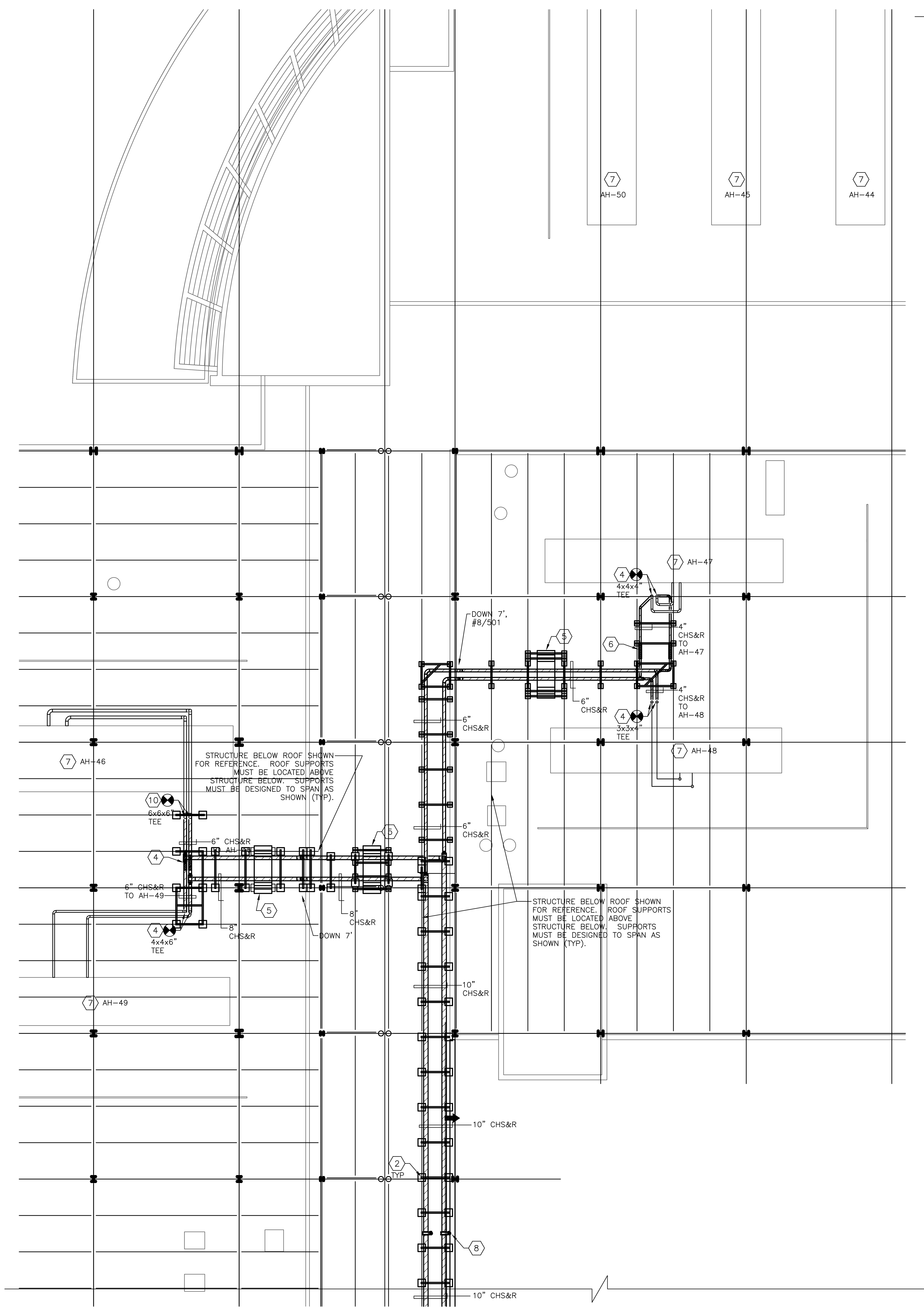
Building Number: CAMPUS | Checked: -- | Drawn: --

DRAWING NO. **M-101-NW**

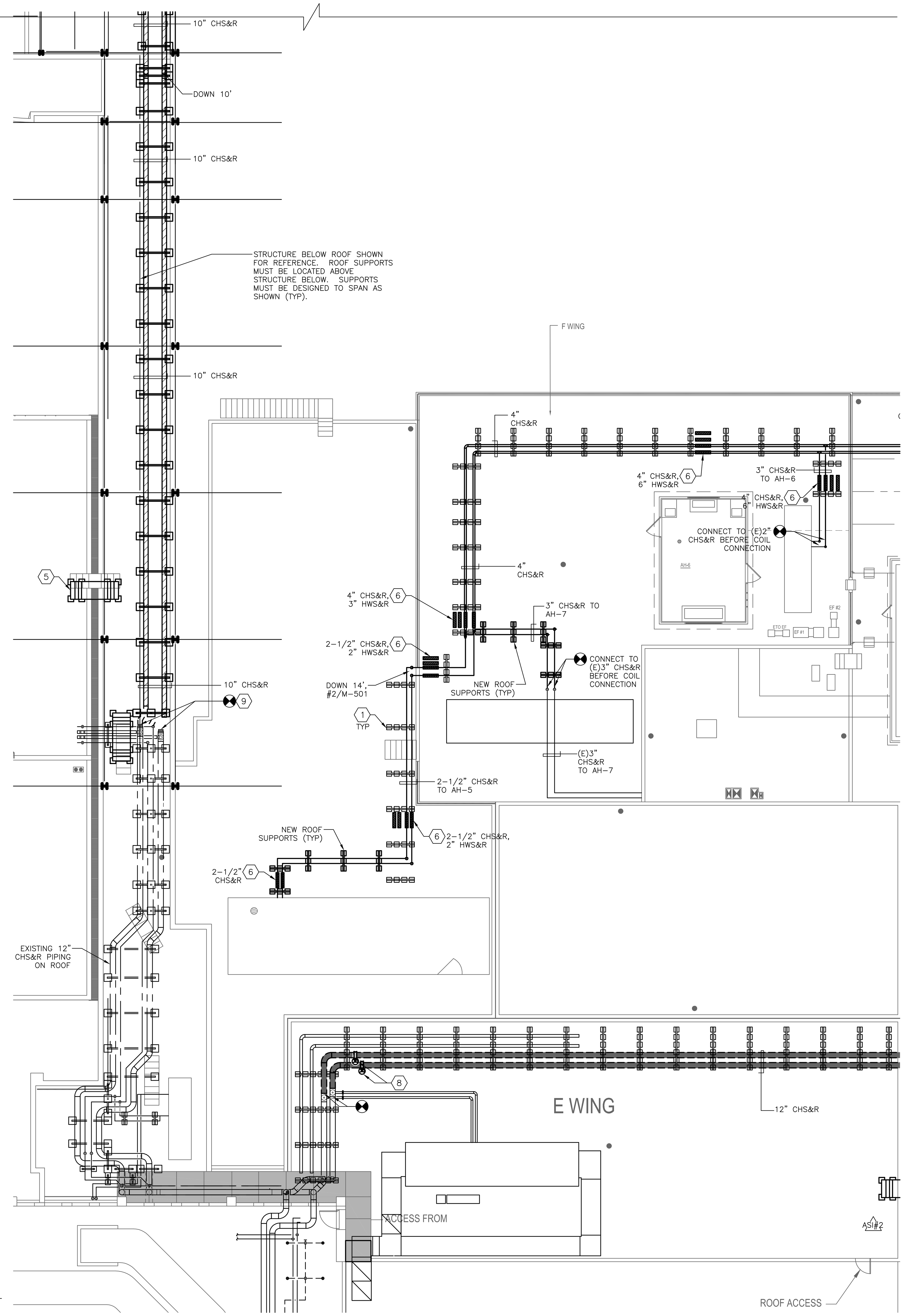
Dwg. 5 of 15

PHOENIX, ARIZONA

Office of Facilities
Veterans Administration



2 MECHANICAL ROOF PLAN - BUILDING 8
SCALE: 3/32" = 1'-0"



1 MECHANICAL ROOF PLAN - SOUTH WEST
SCALE: 3/32" = 1'-0"

General Notes:

1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES.
2. LOCATIONS AND QUANTITIES OF ROOF SUPPORTS SHOWN FOR REFERENCE ONLY. PROJECT INSTALLING THE ROOF SUPPORTS IS ONGOING AT TIME OF DESIGN.
3. IF AN ALTERNATE IS DEDUCTED, PROVIDE A TEE, BFLY VALVE, AND BLIND FLANGE FOR THE FUTURE WORK.

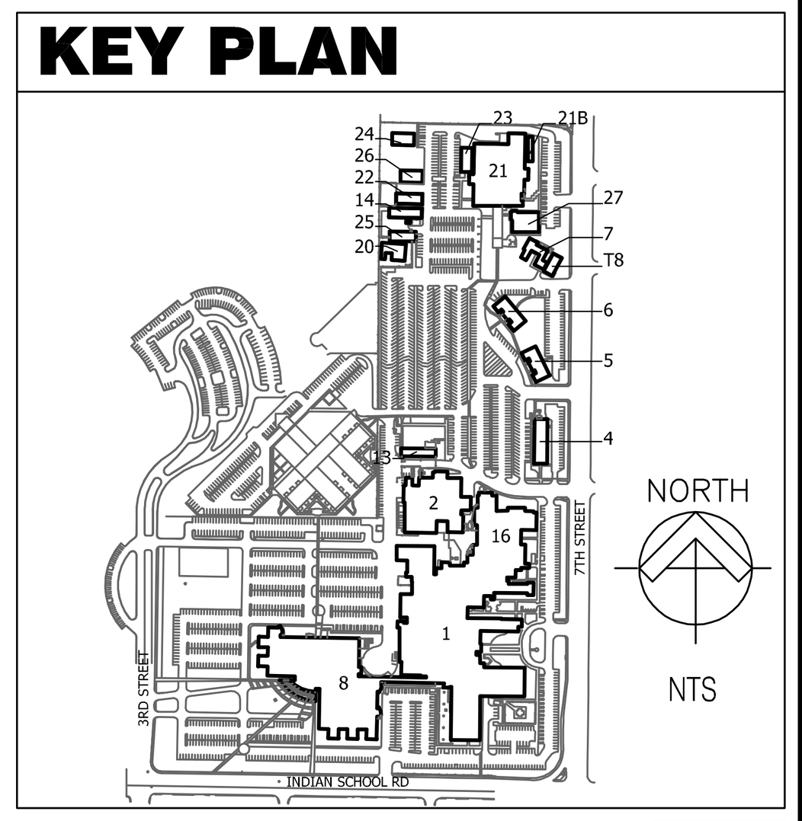
New Work Keynotes: (#)

1. EXISTING UNISTRUT SUPPORT STRUCTURES ('PHP SYSTEMS', SHOWN SCREENED) WITH DESIGN CAPACITY FOR NEW CHILLED WATER PIPING. THE CONTRACTOR SHALL HAVE 'PHP' RECERTIFY THE EXISTING SUPPORT STRUCTURES AND IDENTIFY ANY DEFICIENCIES. EXISTING HEATING HOT WATER PIPING IS PRESENT ON THE STRUCTURE. CONTRACTOR IS RESPONSIBLE FOR MOVING THE EXISTING HEATING PIPING AND PROVIDING ADDITIONAL PIPING, FITTINGS, AND INSULATION AT THE CHILLED OR HEATING PIPING TO ACCOMMODATE THE NEW WORK. THE CONTRACTOR IS RESPONSIBLE FOR CORRECTING ALL DEFICIENCIES WITH THE SUPPORT STRUCTURE. PROVIDE NEW ROLLER SUPPORTS PER DETAIL #6/M-501.
2. NEW UNISTRUT SUPPORT STRUCTURE. REFER TO DETAIL #6/M-501.
3. PROVIDE NEW UNISTRUT SUPPORT STRUCTURE CHS&R PER DETAIL #6/M-001.
4. CONNECT TO EXISTING VERTICAL PIPE WITH NEW TEE (SERVES EXISTING AHU AND BACK-FEEDS BUILDING).
5. PROVIDE CROSSOVER STAIR EQUAL TO 'PHP CROSSOVER'. REFER TO DETAIL #5/M-501. LISTED HEIGHT AND WIDTH FOR REFERENCE ONLY. VERIFY REQUIRED HEIGHT AND WIDTH WITH FIELD CONDITIONS.
6. PROTECT POTENTIAL CLIMB-OVER AREA PER DETAIL #4/M-501.
7. OPT#5: REPLACE COOLING COIL OF EXISTING AIR HANDLING UNITS. REFER TO SCHEDULE.
8. PROVIDE FULL-SIZE BUTTERY-FLY ISOLATION VALVES. PROVIDE 3/4" DRAINS WITH SHUTOFF BALL VALVES BELOW.
9. CONNECT TO EXISTING 12" CHS&R PIPING ON ROOF OF ACC CORRIDOR. REDUCE TO 10".

Piping Legend

DOUBLE-LINE	SINGLE-LINE	OPTION	SYSTEM
(shaded dashed)	------	BASE BID	MAIN LOOP
(open)	——	OPT#2	WEST BRANCH
(hatched)	——	OPT#4	BLDG 8 BRANCH

KEY PLAN



Revisions:	Date
REPACKAGE AND ADJUST SCOPE	04/07/15

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Registered Professional Engineer (Mechanical) — CERTIFICATE NO. 46687 — DUANE M. PALIN — Date Signed 08/19/15 — ARIZONA U.S.A.
EXPIRES 09/30/2016

Drawing Title: **MECHANICAL ROOF PLAN - SOUTH WEST**

Project Title: CARL T. HAYDEN V.A.M.C. INCREASE CAMPUS ELECTRICAL – CW CAPACITY

Date: 08/19/2015

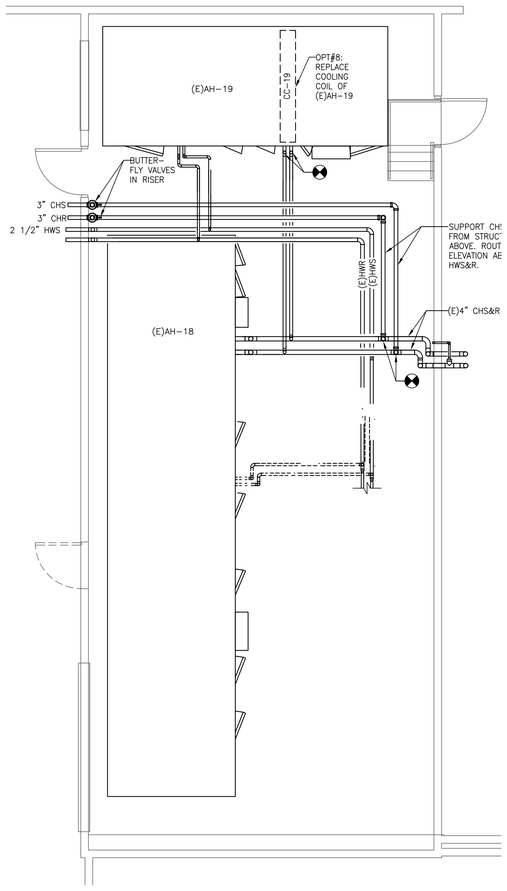
Project No.: 644-13-015

Building Number: CAMPUS | Checked: -- | Drawn: --

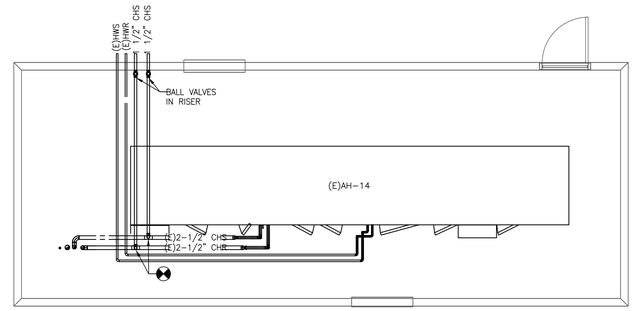
DRAWING NO. **M-101-SW** Dwg. 7 of 15

PHOENIX, ARIZONA

Office of Facilities — Veterans Administration



1 PENTHOUSE 18 & 19 (BASE BID, EXCEPT AS NOTED)
SCALE: 1/4" = 1'-0"



2 PENTHOUSE 14 (BASE BID)
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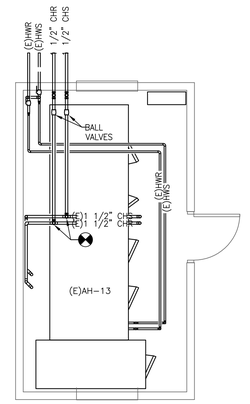

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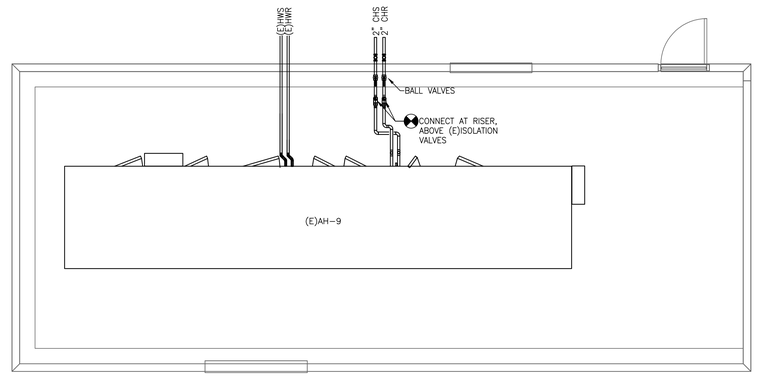
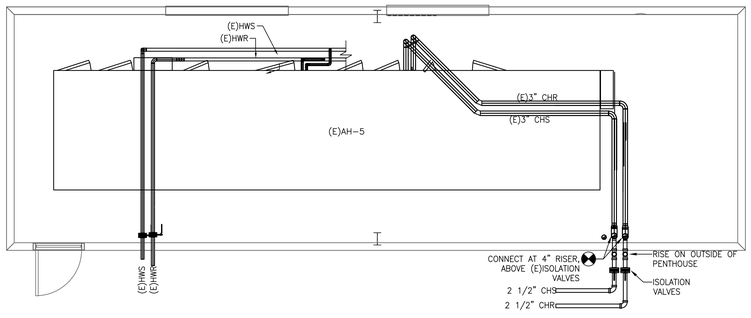
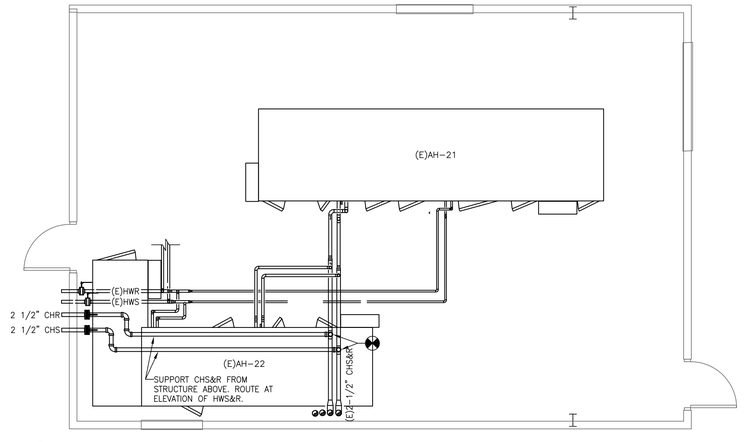


4 PENTHOUSE 9 (BASE BID)
SCALE: 1/4" = 1'-0"

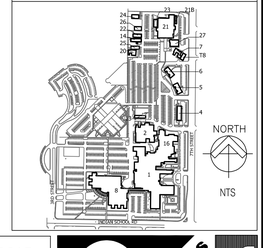


5 PENTHOUSE 5 (OPT#2)
SCALE: 1/4" = 1'-0"



6 PENTHOUSE 21 & 22 (OPT#3)
SCALE: 1/4" = 1'-0"

KEY PLAN



Revisions:	Date
REPACKAGE AND ADJUST SCOPE	04/07/15

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EXPIRES 09/30/2016

Drawing Title: **PENTHOUSE ROOM PLANS**

Project Title: CARL T. HAYDEN V.A.M.C.
INCREASE CAMPUS ELECTRICAL – CW CAPACITY

Building Number: CAMPUS | Checked: -- | Drawn: --

PHOENIX, ARIZONA

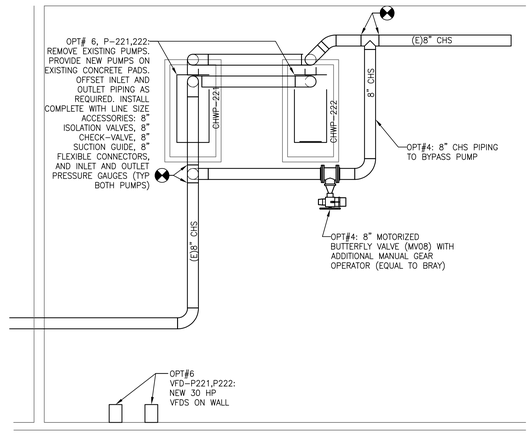
Date: 08/19/2015

Project No.: 644-13-015

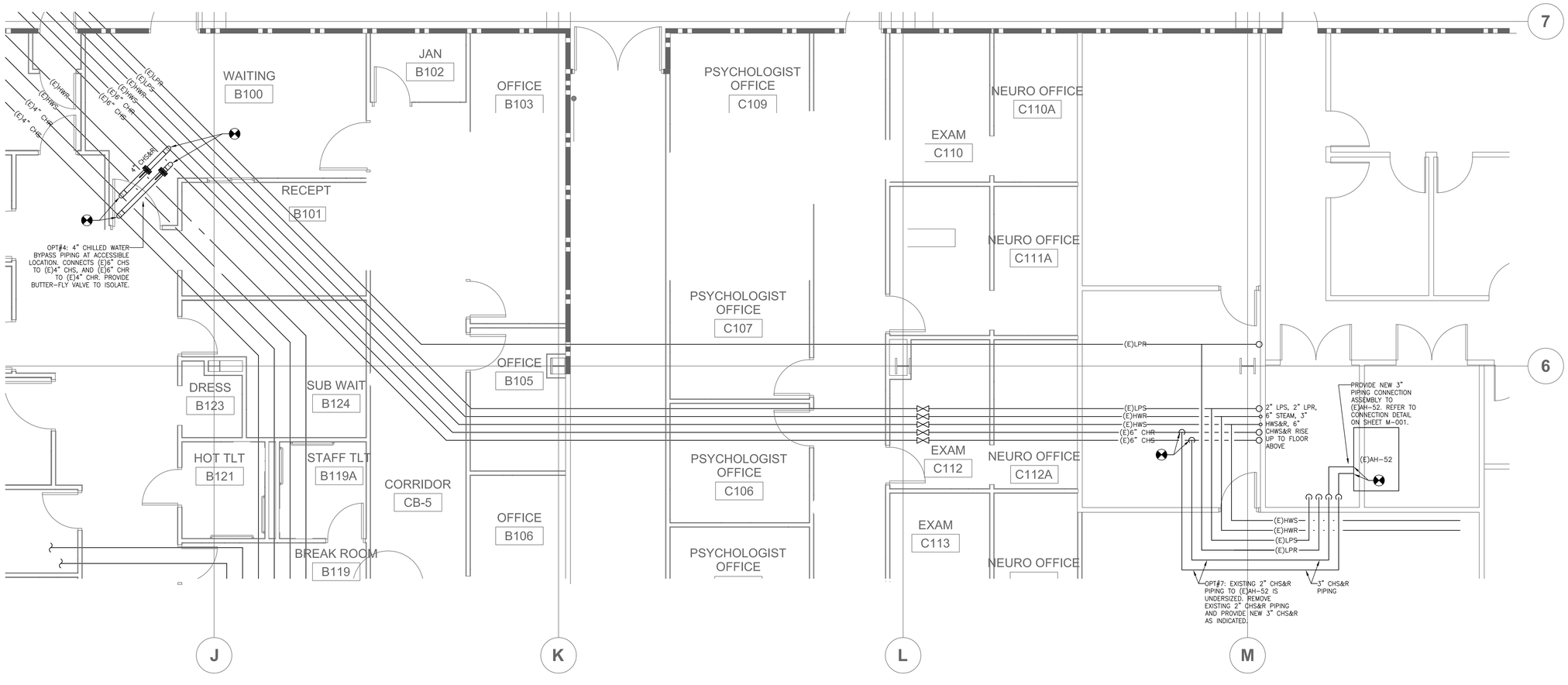
DRAWING NO.: **M-401**

Dwg. 8 of 15

Office of Facilities
Veterans Administration

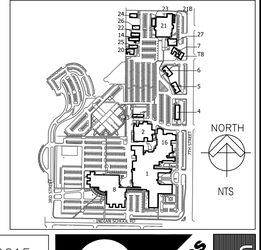


2 BUILDING 8 PUMPS
SCALE: 1/4" = 1'-0"



1 BUILDING 8 BASEMENT WORK
SCALE: 1/4" = 1'-0"

KEY PLAN



Revisions:	Date
REPACKAGE AND ADJUST SCOPE	04/07/15

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Registered Professional Engineer Certificate No. 46687 DUANE M. PALIN Date Signed 09/30/16 ARIZONA U.S.A.
EXPIRES 09/30/2016

Drawing Title: **BUILDING 8 BASEMENT**

Project Title: CARL T. HAYDEN V.A.MC. INCREASE CAMPUS ELECTRICAL – CW CAPACITY

Building Number: CAMPUS | Checked: -- | Drawn: --

PHOENIX, ARIZONA

Date: 08/19/2015

Project No.: 644-13-015

DRAWING NO. **M-402**
Dwg. 9 of 15

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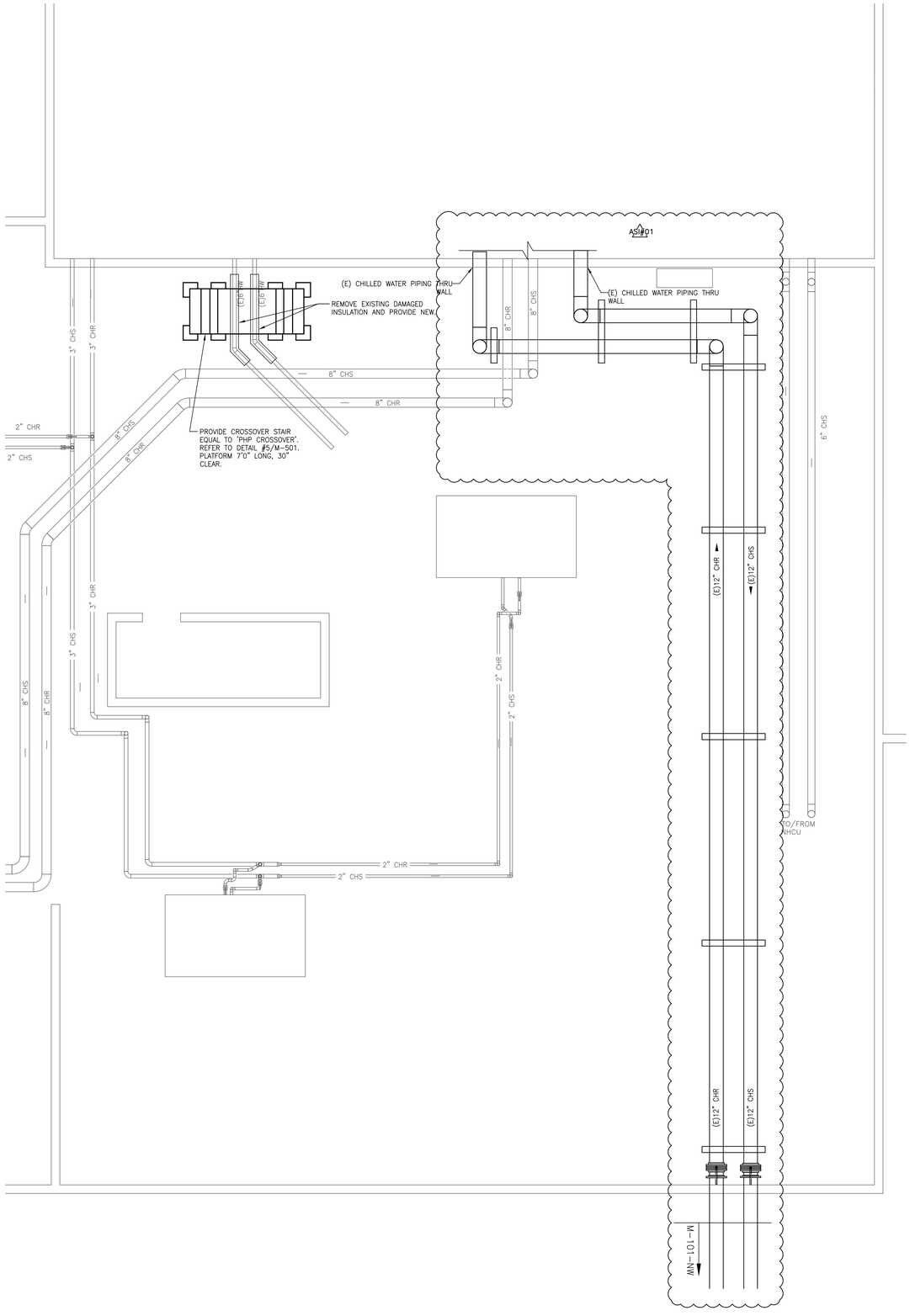
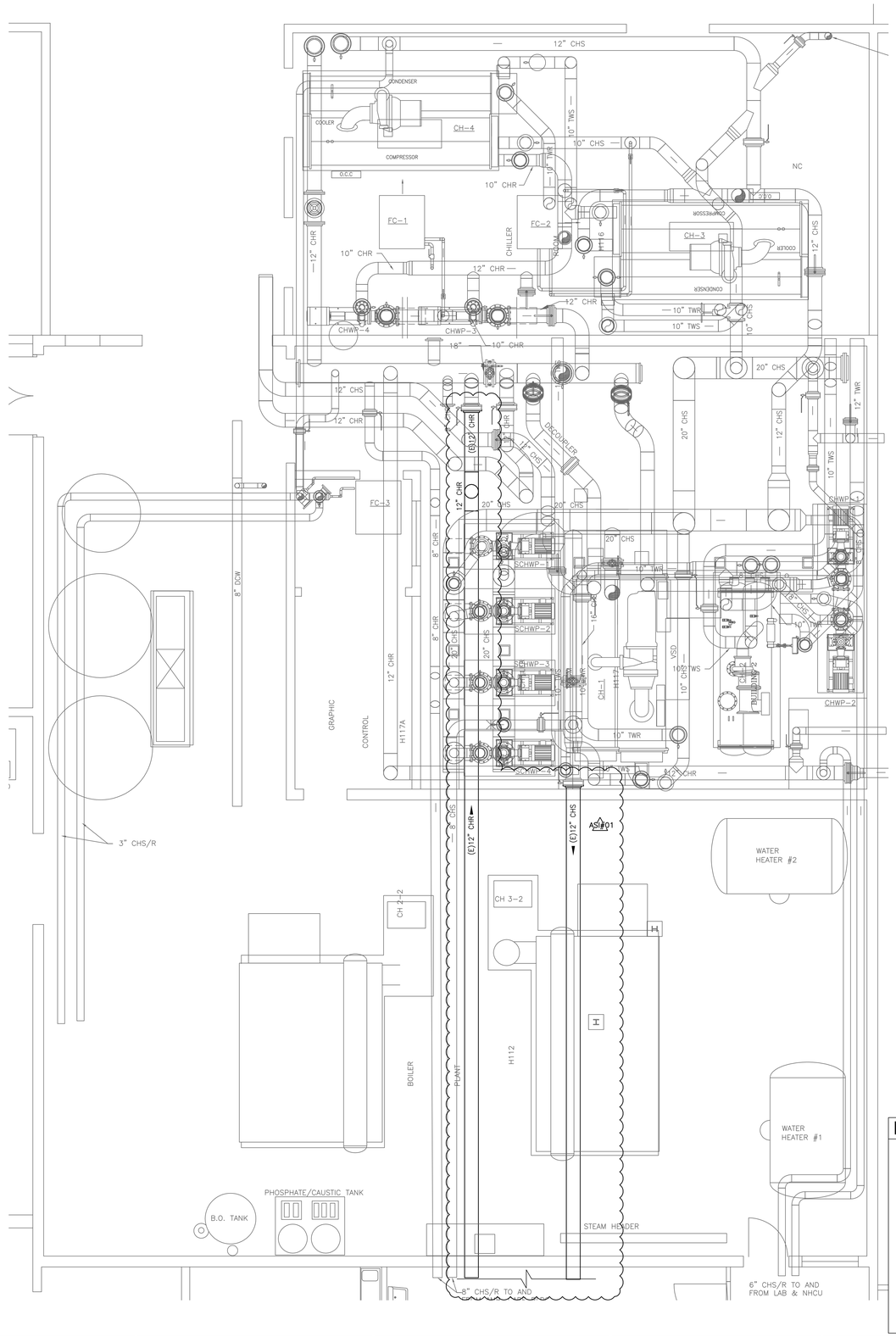
Veterans Administration





3" = 1'-0" 0 1' 2' 4' 8"

1 1/2" = 1'-0" 0 2" 4" 8" 1'

3/4" = 1'-0" 0 4" 8" 1' 2'

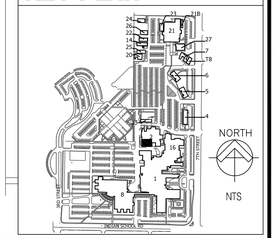
1/2" = 1'-0" 0 4" 8" 1' 2' 3'

3/8" = 1'-0" 0 6" 1' 2' 4'

1/4" = 1'-0" 0 1' 2' 4' 6'

1/8" = 1'-0" 0 2' 4' 8' 12'

KEY PLAN



Revisions:	Date
AS#01 BID OPTION SCOPE MODIFICATION	03/05/14
REPACKAGE AND ADJUST SCOPE	04/07/15

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EXPIRES 09/30/2016

Drawing Title:
EXISTING CENTRAL PLANT PIPING AND NEW STAIR CROSSOVER.
AS#01

Project Title
CARL T. HAYDEN V.A.M.C.
INCREASE CAMPUS ELECTRICAL – CW CAPACITY

Building Number: CAMPUS
Checked: --
Drawn: --
PHOENIX, ARIZONA

Date: 08/19/2015
Project No.: 644-13-015
DRAWING NO.: M-403
Dwg. 10 of 15

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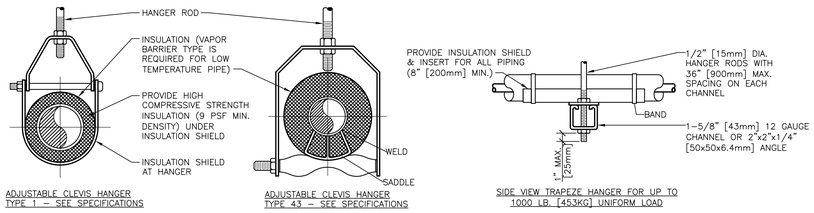


ADJUSTABLE CLEVIS HANGER TYPE 1 – SEE SPECIFICATIONS

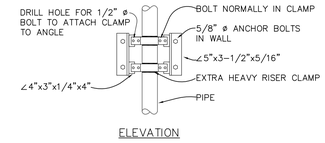
ADJUSTABLE CLEVIS HANGER TYPE 43 – SEE SPECIFICATIONS

SIDE VIEW TRAPEZE HANGER FOR UP TO 1000 LB. [453KG] UNIFORM LOAD

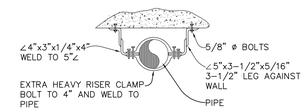
MAXIMUM PIPE/TUBING SUPPORT SPACING																			
NOM. SIZE	IN. [mm]	THRU 3/4 THRU [20]	1 [25]	1 1/4 [32]	1 1/2 [40]	2 [50]	2 1/2 [65]	3 [75]	4 [100]	5 [125]	6 [150]	8 [200]	10 [250]	12 [300]	14 [350]	16 [400]	18 [450]	20 [500]	24 [600]
PIPE	FT. [mm]	7 [2100]	7 [2100]	7 [2100]	9 [2700]	10 [3000]	11 [3400]	12 [3700]	14 [4100]	16 [4900]	17 [5200]	19 [5800]	22 [6700]	23 [7000]	25 [7600]	27 [8200]	28 [8500]	30 [9100]	32 [9600]
TUBING	FT. [mm]	5 FT [1500]	6 [1800]	7 [2100]	8 [2400]	8 [2400]	9 [2700]	10 [3000]	12 [3700]	13 [4000]	14 [4100]	16 [4900]	–	–	–	–	–	–	–
NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.																			

NOTES:
SEE SPECIFER FOR DETAILED HANGER REQUIREMENTS

3 PIPE HANGERS
NTS



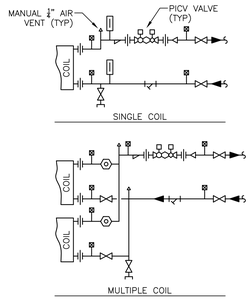
ELEVATION



PLAN

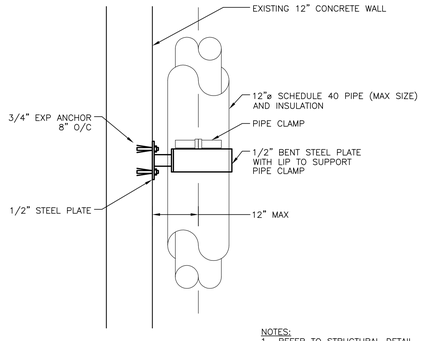
GENERAL NOTES:
1. LOCATE VERTICAL SUPPORTS AT 10'-0" MAX INTERVALS.

2 ANCHOR TO VERTICAL WALL (PIPE 4" MAX)
NO SCALE



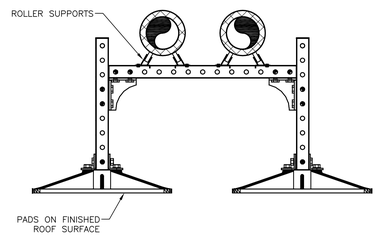
GENERAL NOTES:
1. PIPING SHALL BE INSTALLED IN SUCH MANNER THAT IT WILL NOT BLOCK THE SWING OR USE OF ACCESS DOORS OR PANELS; NEITHER SHALL IT BLOCK THE SERVICING OF FILTERS, VAV'S, OR EQUIPMENT. THE PIPE HANGERS SHALL SUPPORT THE RUNOUT PIPING INDEPENDENT OF COIL. WHEN THE COIL IS SUBJECT TO VIBRATION, THE FIRST (2) HANGERS SHALL BE SPRING & NEOPRENE AS REQUIRED.
2. MULTIPLE-COIL: CROSS-SECTIONAL AREA OF COMBINED BRANCH PIPING SHALL EQUAL OR EXCEED CROSS-SECTIONAL AREA OF MAINS SERVING BRANCH PIPING AND VELOCITY THRU BRANCH PIPING SHALL NOT EXCEED 6 FPS [1.8 M/S].
3. PROVIDE MANUAL AIR VENT WHEN COIL IS NOT SELF-VENTING. PROVIDE VALVE AND HOSE-BIB CONNECTION WHEN COIL IS NOT SELF-DRAINING.

1 TYPICAL CONNECTION TO WATER COILS OF AHUS
NTS



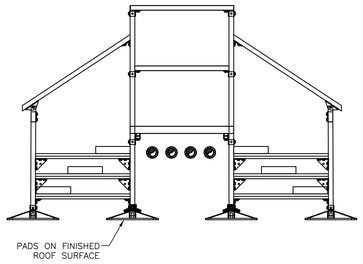
NOTES:
1. REFER TO STRUCTURAL DETAIL.
2. LOCATE SUPPORTS AT 8'-0" O/C MAX. PROVIDE MINIMUM OF 2 SUPPORTS AT TOP, BOTTOM.

7 VERTICAL PIPING SUPPORTS
NTS



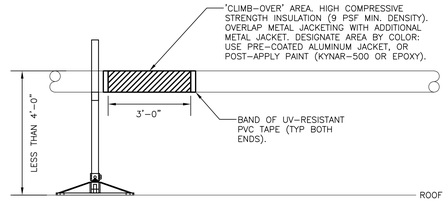
GENERAL NOTES:
1. PRE-FABRICATED ROOF SUPPORT EQUAL TO 'PHP'. VERIFY REQUIRED HEIGHT AND WIDTH WITH PIPE LAYOUT..
2. BASES: INJECTION MOLDED HIGH DENSITY/HIGH IMPACT POLYPROPYLENE WITH UV-INHIBITORS AND ANTIOXIDANTS.
3. FRAMING: 12 GAUGE THICKNESS. HOT DIP GALVANIZED STEEL PER ASTM A123; OR STAINLESS STEEL WITH MILL FINISH.

6 PRE-FABRICATED ROOF PIPE SUPPORT
NTS



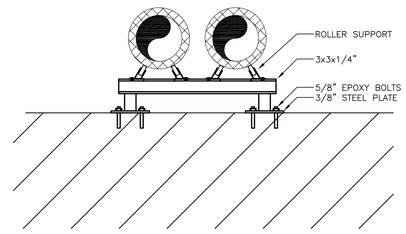
GENERAL NOTES:
1. PRE-FABRICATED CROSSOVER STAIR EQUAL TO 'PHP CROSSOVER'. VERIFY REQUIRED HEIGHT AND WIDTH WITH PIPE LAYOUT..
2. BASES: INJECTION MOLDED HIGH DENSITY/HIGH IMPACT POLYPROPYLENE WITH UV-INHIBITORS AND ANTIOXIDANTS.
3. FRAMING: 12 GAUGE THICKNESS. HOT DIP GALVANIZED STEEL PER ASTM A123; OR STAINLESS STEEL WITH MILL FINISH.

5 PRE-FABRICATED CROSSOVER STAIR
NTS



GENERAL NOTES:
1. CONTRACTOR OPTION: PIPE CLIMB-OVER AREA SHALL NOT BE REQUIRED WHEN TOP OF PIPE ELEVATION IS GREATER THAN 4'-0" ABOVE FINISHED ROOF AND 'CRAWL-UNDER' IS THEN FEASIBLE.
2. PIPE CLIMB-OVER LOCATIONS SHALL BE PROVIDED AT 50' INTERVALS FROM THE NEAREST STAIR CROSSOVER OR AS OTHERWISE INDICATED ON PLANS.
3. COORDINATE COLORS WITH OWNER (DARK GRAY, YELLOW PVC).

4 PIPE CLIMB-OVER PROTECTION
NTS



8 PIPING SUPPORT AT PARAPET
NTS

Revisions:	Date
REPACKAGE AND ADJUST SCOPE	04/07/15

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EXPIRES 09/30/2016

Drawing Title: **MECHANICAL DETAILS**

Project Title: CARL T. HAYDEN V.A.M.C.
INCREASE CAMPUS ELECTRICAL – CW CAPACITY

Building Number: CAMPUS
Checked: --
Drawn: --
PHOENIX, ARIZONA

Date: 08/19/2015
Project No.: 644-13-015
DRAWING NO.: **M-501**
Dwg. 11 of 15

Office of Facilities
Veterans Administration

CONTROL VALVE REPLACEMENT SCHEDULE (BASE BID)

MARK	AHU	LOCATION	GPM	BASIS OF DESIGN	REMARKS
MV07	AH-07	ROOF, BUILDING 1	75	BELIMO ePIV, PRESSURE INDEPENDENT, ENERGY PACKAGE	OUTDOORS
MV08	–	BASEMENT, BUILDING 8	–	ISOLATION VALVE AT PUMP. REFER TO ENLARGED PLAN.	CONDITIONED
MV29	AH-29	ROOF, BUILDING 2	69	BELIMO ePIV, PRESSURE INDEPENDENT, ENERGY PACKAGE	OUTDOORS
MV40	AH-40	ROOF, BUILDING 2	90	BELIMO ePIV, PRESSURE INDEPENDENT, ENERGY PACKAGE	OUTDOORS
MV41	AH-41	ROOF, BUILDING 2	90	BELIMO ePIV, PRESSURE INDEPENDENT, ENERGY PACKAGE	OUTDOORS
MV42	AH-42	ROOF, BUILDING 2	100	BELIMO ePIV, PRESSURE INDEPENDENT, ENERGY PACKAGE	OUTDOORS
MV43	AH-43	ROOF, BUILDING 2	100	BELIMO ePIV, PRESSURE INDEPENDENT, ENERGY PACKAGE	OUTDOORS
MV52	AH-52	BASEMENT, BUILDING 8	105	BELIMO ePIV, PRESSURE INDEPENDENT, ENERGY PACKAGE	CONDITIONED
MV58	AH-58	ROOF, BUILDING 2	30	BELIMO ePIV, PRESSURE INDEPENDENT, ENERGY PACKAGE	OUTDOORS
MV59	AH-59	ROOF, BUILDING 2	70	BELIMO ePIV, PRESSURE INDEPENDENT, ENERGY PACKAGE	OUTDOORS
MV60	AH-60	ROOF, BUILDING 2	65	BELIMO ePIV, PRESSURE INDEPENDENT, ENERGY PACKAGE	OUTDOORS

PUMP MIN/MAX

NO. OF PUMPS	MIN %	MAX %
1	15%	50%
2	35%	50%
3	35%	45%
4	40%	100%

VARIABLE FLOW SECONDARY CHILLED WATER PUMPING SYSTEM SEQUENCE OF OPERATION (BASE BID)

CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE SETPOINT:
THE FOLLOWING RESET STRATEGY IS APPLICABLE ONLY WHEN THE MAXIMUM CHILLED WATER TEMPERATURE SETPOINT IS REACHED.

ALL DEFAULT PRESSURE SETPOINTS SHALL BE FIELD ADJUSTED DURING THE TEST-AND-BALANCE AND COMMISSIONING PERIOD TO MEET THE REQUIREMENTS OF ACTUAL FIELD CONDITIONS.

THE EMS SHALL RESET THE SYSTEM DIFFERENTIAL PRESSURE SETPOINTS FROM DEFAULT USING A TRIM AND RESPOND LOGIC WITHIN THE RANGE OF 5 PSIG TO 20 PSIG ONCE THE MAXIMUM CHILLED WATER TEMPERATURE SETPOINT IS REACHED. ONCE THE TEMPERATURE SETPOINT IS REACHED, THE DIFFERENTIAL PRESSURE SETPOINT FOR THE CONTROLLING ZONE SHALL BE TRIMMED BY 0.1 PSIG EVERY TWO MINUTES UNTIL A VALVE IN THE SYSTEM IS 50% OPEN. WHEN A VALVE IN THE SYSTEM RISES TO 80% OPEN, THE DIFFERENTIAL PRESSURE SETPOINT FOR THE CONTROLLING ZONE SHALL BE INCREASED BY 0.1 PSIG EVERY TWO MINUTES. ALL SETPOINTS SHALL BE ADJUSTABLE THROUGH THE OPERATOR WORKSTATION FOR EACH DIFFERENTIAL PRESSURE SENSOR.

CHILLED WATER PUMP CONTROL:
THE CHILLED WATER PUMPS SHALL OPERATE IN A LEAD/LAG/LAG/LAG CONFIGURATION. THE LEAD PUMP SHALL OPERATE ANYTIME THE CHILLED WATER SYSTEM IS ENABLED. DIFFERENTIAL PRESSURE SENSORS SHALL BE INSTALLED AT EACH LOGICAL LOOP AT 2/3 DOWN THE LONGEST RUN OF EACH LOOP. THE PUMPS SHALL MODULATE TO MAINTAIN THE SYSTEM DIFFERENTIAL PRESSURE AT SETPOINT FOR THE CONTROLLING ZONE. THE CONTROLLING ZONE SHALL BE THE DIFFERENTIAL PRESSURE SENSOR WHICH IS FURTHEST BELOW ITS SETPOINT.

REFER TO PUMP MIN/MAX TABLE FOR %. WITH THE STARTED PUMP(S) OPERATING, IF THE SPEED OF THE PUMP(S) REACHES MAX % (ADJ) AND CANNOT MAINTAIN THE DIFFERENTIAL PRESSURE AT SETPOINT, THE NEXT LAG PUMP SHALL START. ALL PUMPS SHALL MODULATE IN UNISON TO MAINTAIN THE DIFFERENTIAL PRESSURE AT SETPOINT.

REFER TO PUMP MIN/MAX TABLE FOR %. WITH THE STARTED PUMP(S) OPERATING, IF THE SPEED OF THE PUMP(S) FALLS BELOW MIN % (ADJ), A LAG PUMP SHALL STOP. THE SPEED OF THE LEAD PUMP SHALL NOT DROP BELOW 15% (ADJ).

CHILLED WATER PUMP ROTATION:
MANUAL OR AUTOMATIC ROTATION OF THE PUMPS SHALL BE ALLOWED. ROTATION TIME INTERVAL SHALL BE 30 DAYS (ADJUSTABLE). THE APPLICATION SHALL ALSO PROVIDE A SETTING (OPERATOR SELECTABLE) TO ALLOW A FORCED ROTATION WHICH SHALL CAUSE THE PUMPS TO BE IMMEDIATELY ENABLED /DISABLED.

CHILLED WATER PUMP FAILURE DETECTION AND RECOVERY:
THE EMS SHALL MONITOR THE STATUS OF EACH PUMP THROUGH A SET OF CONTACTS IN THE VFD. UPON SENSING A PUMP FAILURE, THE EMS SHALL LOCKOUT THAT PUMP AND IMMEDIATELY INITIATE THE START OF THE NEXT PUMP IN THE ROTATION SEQUENCE. WHEN A PUMP IS MARKED AS HAVING FAILED, THE FAILED PUMP SHALL BE TAKEN OUT OF THE ROTATION.

CHILLED WATER PUMP FAILURE RESET:
WHEN AN INDIVIDUAL PUMPS FAILURE IS RESET AT THE OPERATOR WORKSTATION, THE EMS SHALL RE-INSERT THAT PUMP INTO THE ROTATION OF PUMPS. ALL FAILURES SHALL BE RESET THROUGH THE EMS OPERATOR WORKSTATION.

DIFFERENTIAL PRESSURE SENSOR:
POLL THE (2) NEW DIFFERENTIAL PRESSURES AT THE REMOTE LOCATIONS. MAINTAIN PUMP SPEED UPON LOSS OF COMMUNICATION.

VARIABLE FLOW CHILLED WATER BOOSTER PUMPING SYSTEM SEQUENCE OF OPERATION (OPT#4)

CHILLED WATER PUMP CONTROL:
THE CHILLED WATER PUMPS SHALL OPERATE IN A PRIMARY/BACKUP CONFIGURATION. DIFFERENTIAL PRESSURE SENSORS SHALL BE INSTALLED AT 2/3 DOWN THE LONGEST RUN.

WITH THE PUMP BYPASS PIPING OPENED AND DIFFERENTIAL PRESSURE BELOW SETPOINT BY 2 PSI (ADJ), THE BYPASS VALVE SHALL CLOSE AND THE PRIMARY PUMP SHALL START AFTER AN ADJUSTABLE DELAY. THE PUMP SHALL MODULATE TO MAINTAIN THE DIFFERENTIAL PRESSURE AT SETPOINT.

WITH THE PRIMARY PUMP OPERATING, IF THE SPEED OF THE PUMP FALLS BELOW 15% (ADJ), THE BYPASS VALVE SHALL OPEN AND THE PUMP SHALL STOP.

CHILLED WATER PUMP ROTATION:
MANUAL OR AUTOMATIC ROTATION OF THE PUMPS SHALL BE ALLOWED. ROTATION TIME INTERVAL SHALL BE 30 DAYS (ADJUSTABLE). THE APPLICATION SHALL ALSO PROVIDE A SETTING (OPERATOR SELECTABLE) TO ALLOW A FORCED ROTATION WHICH SHALL CAUSE THE PUMPS TO BE IMMEDIATELY ENABLED/DISABLED.

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DIFFERENTIAL PRESSURE SENSOR:
POLL THE NEW DIFFERENTIAL PRESSURE AT THE REMOTE LOCATION. MAINTAIN PUMP SPEED UPON LOSS OF COMMUNICATION.

General Notes:

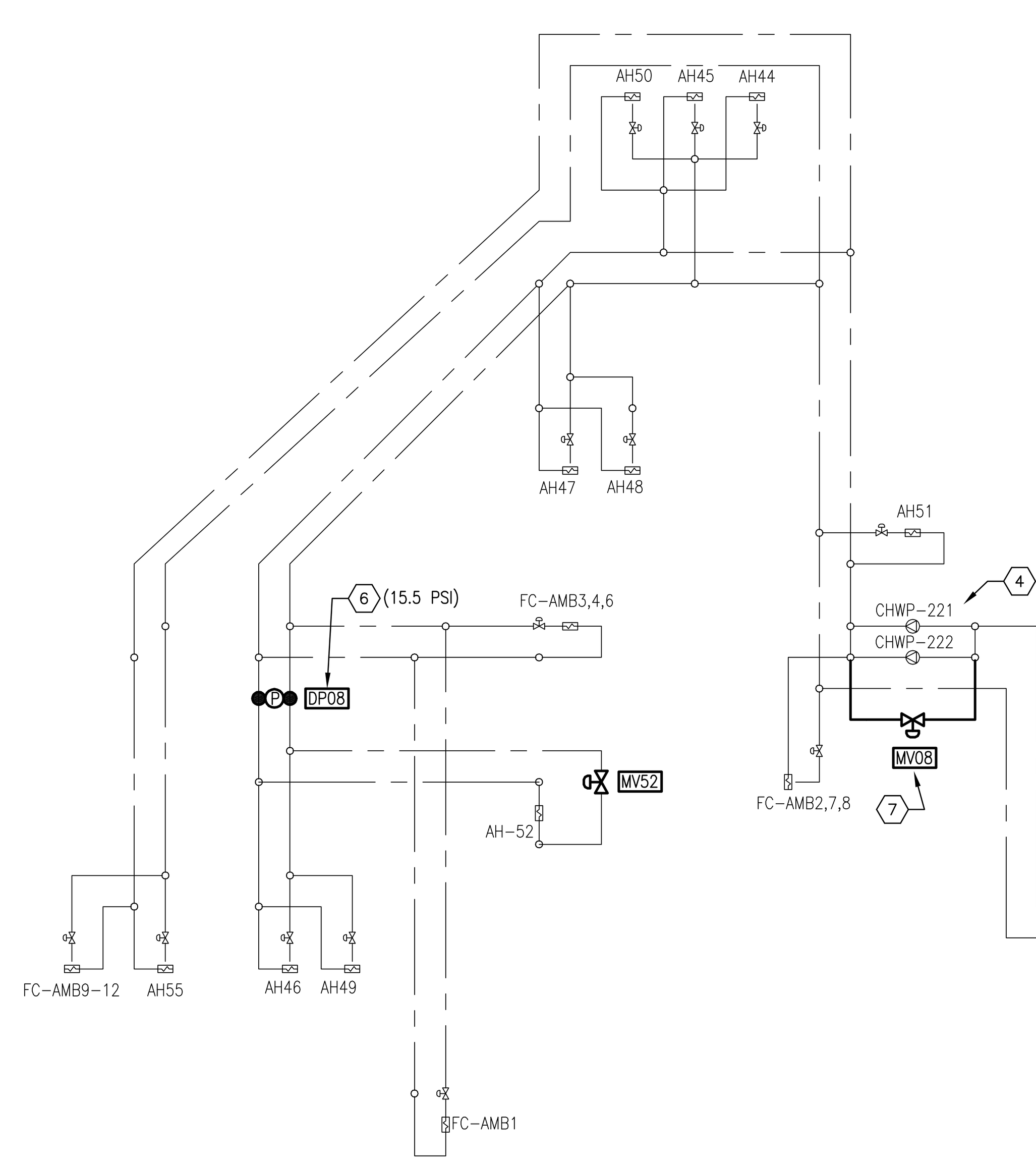
1. REFER TO SHEET M-001 FOR ADDITIONAL GENERAL NOTES.
2. NEW WORK SHOWN ON THIS SHEET INVOLVES MECHANICAL CONTRACTOR, TEST-AND-BALANCE CONTRACTOR, AND CONTROLS CONTRACTOR.

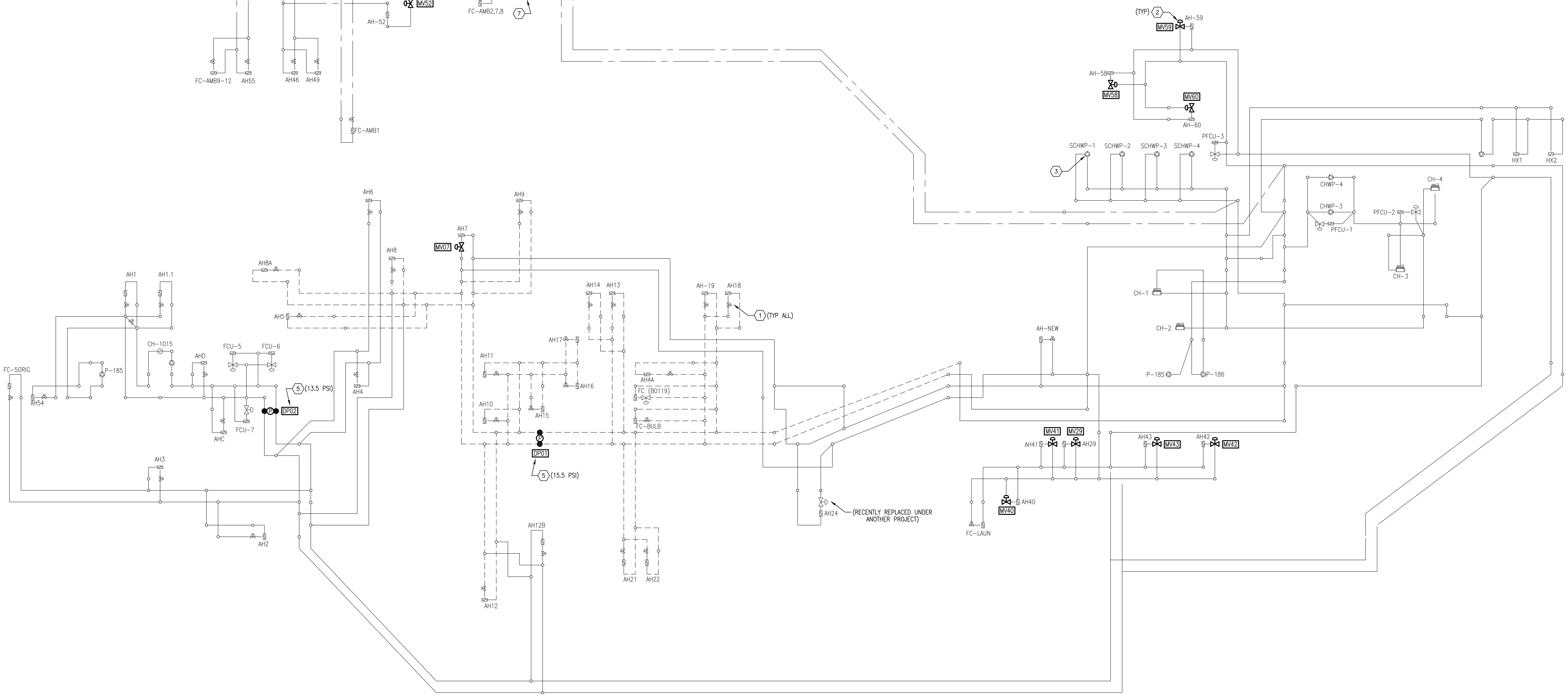
New Work Keynotes: ⟨#⟩

1. BASE BID: ALL AIR HANDLING UNITS MUST BE BALANCED AFTER NEW WORK CONSTRUCTION IS COMPLETED. OVERRIDE HOUSE PUMPS TO 18 PSI (CONSULT COTR AND EOR IF OPTIONS ARE DEDUCTED FROM PROJECT) AT PLANT. OVERRIDE BUILDING 8 PUMP TO 60 HZ AT PUMPS. ADJUST BALANCING VALVE AT EACH AIR HANDLING UNIT AND FAN COIL TO ACHIEVE DESIGN GPM. WHERE BALANCING VALVE INFORMATION IS LACKING, MEASURE FLOW WITH ULTRASONIC METER. IF DESIGN GPM CANNOT BE ACHIEVED, OPEN BALANCING VALVE 100% (DO NOT INCREASE PUMP PSI).
2. BASE BID: REPLACE EXISTING CONTROL VALVE. REARRANGE PIPING RUNOUT WHERE REQUIRED (NEW VALVE IS LONGER). INSULATE CONTROL VALVE AND ALL ACCESSORIES. REMOVE BALANCING VALVE OR OPEN 100%. REFER TO CONTROL VALVE REPLACEMENT SCHEDULE.
3. BASE BID: EXISTING PUMPS ARE CONTROLLED BY DELTA-T. EXISTING VARIABLE SPEED DRIVES AND SENSORS ARE SUFFICIENT, UNLESS NOTED OTHERWISE. RE-PROGRAM CONTROL SEQUENCE PER 'VARIABLE FLOW SECONDARY CHILLED WATER PUMPING SYSTEM SEQUENCE OF OPERATION'.
4. OPT#4: EXISTING PUMPS ARE CONTROLLED BY DELTA-T FROM CENTRAL PLANT. RE-PROGRAM CONTROL SEQUENCE PER 'VARIABLE FLOW CHILLED WATER BOOSTER PUMPING SYSTEM SEQUENCE OF OPERATION'.
5. BASE BID: INSTALL DIFFERENTIAL PRESSURE ASSEMBLY AT LOCATION SHOWN. DEFAULT PRESSURE SETPOINTS ARE LISTED ON THE DIAGRAM.
6. OPT#4: INSTALL DIFFERENTIAL PRESSURE ASSEMBLY AT LOCATION SHOWN. DEFAULT PRESSURE SETPOINTS ARE LISTED ON THE DIAGRAM.
7. OPT#4: MOTORIZED 8" BUTTERFLY VALVE (SHUTOFF).

DESIGN GPM SCHEDULE

MARK	DESIGN GPM
AH-C	712.9
AH-D	712.9
AH-1	61.0
AH-1.1	24.1
AH-2	93.7
AH-3	26.9
AH-4	7.7
AH-4A	20.5
AH-5	47.8
AH-6	27.1
AH-7A	75.1
AH-8	41.0
AH-8A	27.6
AH-9	31.1
AH-10	66.9
AH-11	34.8
AH-12	77.9
AH-13	12.5
AH-14	15.3
AH-15	42.1
AH-16	43.7
AH-17	57.2
AH-18	58.2
AH-19	105.9
AH-21	26.3
AH-22	10.2
AH-54	46.2
AH-24	228.8
AH-29	69.3
AH-40	57.0
AH-41	57.0
AH-42	64.1
AH-43	64.1
AH-58	29.3
AH-59	66.6
AH-60	44.4
AH-44	82.2
AH-45	79.4
AH-46	232.9
AH-47	94.4
AH-48	83.9
AH-49	151.8
AH-50	94.4
AH-51	76.6
AH-52	102.3
AH-55	189.0
AH-12B	46.5
AH-NEW	16.8
AH-56	51.9
AH-57	87.5
AH-58	58.0





Revisions:	Date
REPACKAGE AND ADJUST SCOPE	04/07/15

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Registered Professional Engineer (Mechanical) CERTIFICATE NO. 46687 DUANE M. PALIN Date Signed 08/19/15 ARIZONA U.S.A.
EXPIRES 09/30/2016

Drawing Title: **MECHANICAL CONTROL DIAGRAMS**

Project Title: CARL T. HAYDEN V.A.M.C. INCREASE CAMPUS ELECTRICAL – CW CAPACITY

Building Number: CAMPUS | Checked: -- | Drawn: --

PHOENIX, ARIZONA

Date: 08/19/2015

Project No. 644-13-015

DRAWING NO. M-801

Dwg. 12 of 15

Office of Facilities

Veterans Administration